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EXAMINER	
KINSAUL, DANIEL W	

ART UNIT	PAPER NUMBER
2165	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/774,575	SUTANTO ET AL.	
	Examiner	Art Unit	
	DANIEL KINSAUL	2165	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 July 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6,9-14,16-18 and 21-24* is/are rejected.

7)☒ Claim(s) *2, 7, 8, 15, 19 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8 July 2010 has been entered. Claims 1-24 are pending.

2. All references relied upon and not cited in the current PTO-892 may be found in previous 892's or IDS'.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 6, 14 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: a target for the steps of assigning the first and second ancestor nodes. The claims fail to recite a location, structure, target or destination for the assigned first and second ancestor nodes. It is recommended that Applicants amend the claims to recite language in accordance with paragraph [0023] of the specification - which recites that the assigning step is directed towards determining the best or most appropriate candidate node to assign or place in the second data structure.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 3, 5, 14, 16, 18 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Recognizing Mathematical Expressions Using Tree Transformations," by Zanibbi et al (2002), (hereinafter Zanibbi) in view of Weise (US Pat. No. 6,275,791 B1) and in further view of Carman (US Pat. No. 5,454,046).

With respect to independent claim 1, Zanibbi discloses **a computer-implemented method for processing data using a computer system having processor, memory, and data storage subsystems** at Abstract, p. 1457, Fig. 3 (i.e. the method takes place in a computing system using code, etc.).

Wherein the second data structure includes at least a first set of leaf nodes under a first ancestor node and a second set of leaf nodes under a second ancestor node is disclosed at p. 1456, col. 2, Fig. 2(d) (i.e. operator tree with two sets of leaf nodes under two ancestor nodes).

Identifying one or more potential candidate nodes for the first ancestor node via the processor based, at least in part, on ancestor nodes from the first data structure associated with the leaf nodes in the first set and identifying one or more potential candidate nodes for

the second ancestor node via the processor based, at least in part, on ancestor nodes from the first data structure associated with the leaf nodes in the second set is disclosed at p. 1456, col. 2, Fig. 2(b)-(d) (i.e. the root nodes Integer Subtract, integer add, exponent, and divide in the operator tree (d) are determined by their relationships with leaf nodes of the first set (A and C) and second set (B and 2) as well as D).

Assigning the first ancestor node based on a selection of the potential candidate node most often identified as associated with the leaf nodes in the first set at p. 1456, col. 2, Fig. 2 (i.e. leaf nodes AC and most identified as associated with the superscript node, which becomes the ancestor node Exponent in the final tree of 2(b)). Selection is the process of determining which node to place where in the subsequently transformed tree.

It is noted that Zanibbi does not appear to explicitly disclose **assigning the second ancestor node based on a selection of one or more criteria other than the potential candidate node most often identified as associated with the leaf nodes in the second set.** However, Weise discloses this limitation at col. 8, lines 7-41 (i.e. logic in the parser for applying syntax rules in the placement of nodes - where nodes may be combined into a new intermediate-level node - where the "criteria other" is based on syntax rules for joining and creating new nodes).

Additionally, it is noted that Zanibbi discloses a selection process at least at col. 8, lines 7-41 for determining which nodes to place or combine into the full-sentence syntax parse tree.

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Zanibbi and Weise before him or her, to modify the tree

transformation system of Zanibbi et al with the parser system of Weise; because Weise teaches that this limitation is useful in a parsing system employing a tree structure (Abstract).

It is noted that Zanibbi and Weise do not appear to completely and explicitly disclose **providing a mirror data structure to represent a first data structure; supplying input data to a plurality of parser analysis engines via snapshots of the mirror data structure; operating on the snapshots by the plurality of parser analysis engines to form a second data structure**. However, Carman teaches a handwriting recognition system that operates in two levels: a first level that recognizes an entire set of user entered time ordered stroke sequences in a single unit; and a second, parser-level recognition where sets of user entered time ordered strokes are segmented and examined in segment groups for individual character or character sequence level recognition (col. 3, lines 7-37). Furthermore, Carman teaches that the parser system creates a search tree in its recognition process (col. 5, lines 62 - col. 6).

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Zanibbi, Weise and Carman before him or her, to modify the tree transformation system of Zanibbi et al and the parser system of Weise; because Carman teaches that these limitations are useful in a system that performs recognition utilizing parsing and a tree structure (Abstract; col. 6).

With respect to dependent claim 3, it is noted that Zanibbi does not appear to explicitly disclose that **assigning the second ancestor node comprises creating a new node**. However, Weise discloses this limitation at col. 8, lines 7-41 (i.e. the logic of the parse tree includes an

operation for combining two certain types of nodes into a new intermediate-level node - based on syntax rules).

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Zanibbi and Weise before him or her, to modify the tree transformation system of Zanibbi et al with the parser system of Weise; because Weise teaches that this limitation is useful in a parsing system employing a tree structure (Abstract).

With respect to dependent claim 5, it is noted that Zanibbi and Weise do not appear to explicitly disclose **receiving user touch input via a touch-sensitive user input device**. However, Carman discloses this limitation at Fig. 1.

With respect to independent claim 14, the claim corresponds to independent claim 1; and is rejected for the reasons discussed above. Furthermore, Zanibbi discloses the use of mirror structures in transforming the data from one form into another at Figs. 2 and 6.

With respect to dependent claim 16, Zanibbi discloses that **the assigned first ancestor node differs from the assigned second ancestor node** at p. 1456, col. 2, Fig. 2 (i.e. exponent and divide ancestor nodes).

With respect to independent claim 18, the claim corresponds to independent claims 1 and 14; and is rejected for the reasons discussed above. Furthermore, Zanibbi discloses that **the assigned first ancestor node comprises data preserved and maintained from the first data**

structure at p. 1456, Fig. 2 (i.e. the nodes mathematical operations which are "preserved and maintained" as mathematical operators through the transformation).

With respect to dependent claim 21, the claim corresponds to dependent claim 5, and is rejected for the reasons discussed above.

With respect to dependent claim 22, Zanibbi discloses **creating a revised document data structure based on the second data structure and the assigned potential candidate node** at p. 1455, col. 1, Introduction (i.e. an application of the system is the conversion of scientific papers from printed to electronic form); Abstract (i.e. the Lexed BST is translated into Latex).

With respect to dependent claim 23, Zanibbi et al discloses that **the data in the first data structure represents electronic ink data** at p. 1455, Introduction (recognition of handwritten expressions permit users to write mathematical expressions on a data tablet); p. 1456, Fig. 2(a), 2(b) (i.e. the first tree is constructed from the electronic ink data of (a)).

With respect to dependent claim 24, Zanibbi et al discloses that **transforming includes parsing electronic ink data into a hierarchical data structure corresponding to the second data structure** at p. 1456, paragraphs 2-5; Fig. 2(a) (i.e. analyzing symbol layouts by searching for linear structures in the input; ability to handle irregular symbol layouts present in handwritten

expressions; linear structures are organized into a BST as the basis for all subsequent processing).

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over "Recognizing Mathematical Expressions Using Tree Transformations," by Zanibbi et al (2002), (hereinafter Zanibbi) in view of Weise (US Pat. No. 6,275,791 B1) and in further view of Carman (US Pat. No. 5,454,046) - as applied in claim 1 - and further view of Bordawekar et al (US Pub. No. 2005/0028091 A1).

With respect to dependent claim 4, it is noted that Zannibbi and Carman do not appear to explicitly disclose **determining which potential candidate node to assign as the first ancestor node and which potential candidate node to assign as the second ancestor node, based, at least in part, on a determination of which arrangement of potential candidate nodes will most reduce data <u>rewrite</u> processing operations when converting an original document data structure to a form represented by the second data structure.** However, Weise teaches that the invention is geared towards making parsers more accurate and efficient (col. 3, lines 13-30) and that identifying the best candidate node that will generate the complete correct parse tree most efficiently (col. 4, lines 24-41). Additionally, Bordawekar teaches a process directed toward optimal use of trees that includes an amortized update cost and avoidance of re-labeling many nodes in a tree for node insertion or update operations (paragraphs [0055-0058]); paragraph [0140] (i.e. the invention is geared towards reducing relabeling operations for node insertion operations).

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Zanibbi, Weise, Carman and Bordawekar before him or her, to modify the teachings of Zanibbi, Weise and Carman with the hierarchical node management system in Bordawekar; because Bordawekar teaches that these limitations are useful for maintaining order and reducing update costs associated with relabeling a tree upon update or insertion operations for node-tree organized information (Abstract; paragraphs [0055-0058], [0140]).

8. Claims 6 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Recognizing Mathematical Expressions Using Tree Transformations," by Zanibbi et al (2002), (hereinafter Zanibbi) in view of Weise (US Pat. No. 6,275,791 B1), and in further view of Au (US Pub. No. 2003/0130976 A1).

With respect to independent claim 6, the claim corresponds to independent claim 1; and is rejected for the reasons discussed above. Furthermore, Zanibbi discloses that **the assigned first ancestor node comprises data preserved and maintained from the first data structure** at p. 1456, Fig. 2 (i.e. the nodes mathematical operations which are "preserved and maintained" as mathematical operators through the transformation). Additionally, Zanibbi discloses **transforming…via <u>one or more intermediate mirror data structures</u>** at Fig. 2 (i.e. progression from initial input, through various transformations that "mirror" the initial input data; see also Fig. 6). Furthermore, Weise discloses this limitation at col. 8, lines 7-41 (i.e. the system preserves parts of speech and phrases through the transformation - rearranging them and combining them as necessary - but the information itself is maintained and preserved).

It is noted that Zanibbi and Weise do not appear to explicitly disclose **transforming data, said identifying one or more potential candidate nodes for the first ancestor node, said identifying one or more potential candidate nodes for the second ancestor node, said assigning the first ancestor node, and said assigning the second ancestor node are all conducted incrementally as additional input is received**. However, Au discloses this limitation at paragraphs [0149-152] (i.e. passing along additional input along with the current set of candidate nodes to the beginning of another pass through the method - indicative of a repeating process); paragraph [0162] (i.e. the natural language processing system repeatedly responding to a user's input while refining a context node set).

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Zanibbi, Weise and Au before him or her, to modify the tree transformation system of Zanibbi et al and the parser system of Weise with the natural language method of Au; because Au teaches that these limitations are useful in a system employing parse trees for input (paragraph [0115]) that use candidate nodes for analyzing meaning (paragraph [0086], [0090]).

With respect to dependent claim 9, the claim corresponds to dependent claim 3, and is rejected for the reasons discussed above.

With respect to dependent claim 10, Zanibbi discloses **creating a revised document data structure based on the second data structure and the assigned potential candidate node** at p. 1455, col. 1, Introduction (i.e. an application of the system is the conversion of

scientific papers from printed to electronic form); Abstract (i.e. the Lexed BST is translated into Latex).

With respect to dependent claim 11, Zanibbi discloses that **the <u>assigned first ancestor node differs from the assigned second ancestor node</u>** at p. 1456, col. 2, Fig. 2 (i.e. exponent and divide ancestor nodes).

With respect to dependent claim 12, Zanibbi et al discloses that **transforming includes parsing electronic ink data into a hierarchical data structure corresponding to the second data structure** at p. 1456, paragraphs 2-5; Fig. 2(a) (i.e. analyzing symbol layouts by searching for linear structures in the input; ability to handle irregular symbol layouts present in handwritten expressions; linear structures are organized into a BST as the basis for all subsequent processing).

With respect to dependent claim 13, the claim corresponds to dependent claim 5, and is rejected for the reasons discussed above.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over "Recognizing Mathematical Expressions Using Tree Transformations," by Zanibbi et al (2002), (hereinafter Zanibbi) in view of Weise (US Pat. No. 6,275,791 B1) and in further view of Carman (US Pat. No. 5,454,046) - as applied in claim 14 - and further in view of Copperman (US Pat. No. 6,711,585 B1).

With respect to dependent claim 17, it is noted that Zanibbi, Weise and Carman do not appear to explicitly disclose **determine which potential candidate node to assign as the first ancestor node and which potential candidate node to assign as the second ancestor node based, at least in part, on <u>assigning more weight to a leaf node which contains additional data or information</u> when converting an original document data structure to a form represented by the second data structure.** However, Copperman teaches these limitations at Fig. 3 (ele. 100, i.e. taxonomy tags are ordered by weight and grouped by taxonomy); col. 2, lines 13-31 (i.e. terms are analyzed and assigned to one or more taxonomies - and an algorithm is used to determine the relatedness - weight - between each list of terms and its associated taxonomy); col. 8, lines 20-51 (i.e. taxonomy tags are grouped by taxonomy and then ordered by weight - where the ordering is by the weight of the highest-weighted tag associated with that taxonomy); col. 25, lines 49-52 (i.e. terms assigned to each taxonomy are ordered by weight or frequency).

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Zanibbi, Weise, Carman and Copperman before him or her, to modify the teachings of Zanibbi, Weise and Carman with the taxonomy management system of Copperman; because Copperman teaches that these limitations are useful in a system for organizing terms into a hierarchical taxonomy of nodes (Abstract; col. 6, lines 46-62).

Allowable Subject Matter & Recommendations

10. It is recommended that Applicants amend the claims in order to define what constitutes the limitation "most often identified as associated with the leaf nodes…" As described in

paragraph [0023] of Applicants' specification, this limitation is related to a potential candidate node receiving the most votes as the ancestor node from the leaf nodes. Additionally, it is recommended that Applicants amend the independent claims to incorporate a goal or target for the system that is in accordance with the specification - such as processing electronic ink, pen or stylus input into a node structure - in order to distinguish it from unrelated areas of art (see paragraphs [0002-0006] and [0025] of specification).

11. Claims 2, 7, 8, 15, 19 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

12. Applicant's arguments with respect to the independent claims and dependent claim 4 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Aggarwal et al (US Pat. No. 6,092,064) discloses a method of generating rules in a tree node structure that includes merging child nodes using meaningful criteria.

Altschuler et al (US Pat. No. 6,556,983 B1) discloses a method of modeling data in a lattice node structure that includes ancestor node and sibling node elimination.

Douglis et al (US Pub. No. 2004/0260676 A1) discloses a method of detecting subsets in electronic documents that includes a step for converting from one tree to another to produce an augmented tree.

Fernandez et al (US Pat. No. 6,785,673 B1) discloses a method of converting data into a tree structure that includes finding a greatest-common ancestor node for replacement.

Geiger et al (US Pub. No. 2006/0050962 A1) discloses a method of sampling handwritten characters for real-time recognition that includes the use of a tree-node structure.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL KINSAUL whose telephone number is (571)272-9014. The examiner can normally be reached on Monday through Thursday, 8:00am till 5:00pm, alternate Fridays, est..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Neveen Abel-jalil can be reached on (571)272-4074. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DK/ 10-13-10
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